NATURAL RESOURCES CONSERVATION SERVICE

VIRGINIA CONSERVATION PRACTICE STANDARD

RIPARIAN FOREST BUFFER

(Acre)

Code 391

DEFINITION

An area of predominantly trees and/or shrubs located adjacent to and up-gradient from watercourses or water bodies.

PURPOSES

- Reduce excess amounts of sediment, organic material, nutrients and pesticides in surface runoff and reduce excess nutrients and other chemicals in shallow groundwater flow through denitrification and long term sequestering of nutrients.
- Create wildlife habitat and establish wildlife corridors.
- Restore natural riparian plant communities
- Create shade to lower water temperatures to improve habitat for aquatic organisms.
- Provide protection against scour erosion within the floodplain.
- Provide a source of detritus and large woody debris for aquatic and terrestrial organisms.
- Moderate winter temperatures to reduce freezing of aquatic over-wintering habitats.
- To increase carbon storage.

CONDITIONS WHERE PRACTICE APPLIES

On areas adjacent to permanent or intermittent streams, lakes, ponds, wetlands, sinkholes, and other areas of groundwater recharge that are capable of supporting woody vegetation. For areas with severe erosion or unstable banks, refer to Virginia Conservation Practice Standard *Streambank and Shoreline Protection (Code 580)* prior to establishing a riparian forest buffer.

CRITERIA

GENERAL CRITERIA APPLICABLE TO ALL PURPOSES

The location, layout and density of the riparian forest buffer will accomplish the intended purpose and function.

Dominant vegetation will consist of existing, naturally regenerated, or planted trees and shrubs (or any combination) suited to the site and the intended purpose.

All buffers will consist of a Zone 1 & Zone 2.

Zone 1 begins at the normal water line, or at the top of the bank, and extends a minimum distance of 15 feet, measured horizontally on a line perpendicular to the water body.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

An additional strip or area of land, Zone 2, will begin at the edge and up-gradient of Zone 1 and extend a minimum distance of 20 feet, measured horizontally on a line perpendicular to the water body.

The minimum combined width of Zones 1 and 2 will be 100 feet or 30 percent of the flood plain whichever is less, but not less than 35 feet.

Harvesting of trees is not permitted in Zone 1. However, in Zone 2, the removal of products such as timber, fiber, nuts, fruit, and forbs is permitted and encouraged on a periodic and regular basis provided that the intended purpose is not compromised by loss of vegetation or harvesting disturbance.

Only viable, high-quality and adapted planting stock will be used. Trees will be established according to Virginia Conservation Practice Standard *Tree/Shrub Establishment (Code 612)*. Species, planting stock & spacing recommendations will be according to the *Plant Establishment Guide for Virginia*.

Necessary site preparation and planting shall be done at a time and manner to ensure survival and growth of selected species. Control or elimination of existing aggressive/invasive species such as fescue and Bermudagrass shall be completed prior to establishing plantings.

Site preparation shall be sufficient for establishment and growth of selected species and is done in a manner that encourages the volunteer establishment of wind blown light seeded species, i.e., red maple, elm, and sycamore, and does not compromise the intended purpose.

Natural regeneration may be used to establish a buffer, if (1) there is an adequate seed source of desired species in the adjacent area; (2) site conditions are favorable for establishing the desired number and distribution of seedlings within a specified time period and (3) noxious or invasive species are not likely to jeopardize the stand. Fescue pastures are not suitable for natural regeneration.

Livestock shall be excluded from the riparian buffer area. Stream crossings and livestock watering shall be located and sized to minimize impact to the buffer vegetation and functions. (Refer to Virginia Conservation Practice Standards *Fence (Code 382)* and *Animal Trails and Walkways (Code 575)*.

For optimal carbon storage, select plant species that are adapted to the site to assure strong health and vigor and plant the full stocking rate for the site.

ADDITIONAL CRITERIA TO REDUCE EXCESS AMOUNTS OF SEDIMENT, ORGANIC MATERIAL, NUTRIENTS AND PESTICIDES IN SURFACE RUNOFF AND REDUCE EXCESS NUTRIENTS AND OTHER CHEMICALS IN SHALLOW GROUND WATER FLOW

Zone 2 will be expanded in high nutrient, sediment, and animal waste application areas, where the contributing area is not adequately treated or where an additional level of protection is desired.

A Zone 3, grass filter, shall be added to the riparian buffer when adjacent to cropland or other sparsely vegetated or highly erosive areas to filter sediment, address concentrated flow erosion, and maintain sheet flow. The Virginia Conservation Practice Standard *Filter Strip (Code 393)* shall be used to design Zone 3. Refer to the *Plant Establishment Guide for Virginia* for information on species establishment.

ADDITIONAL CRITERIA TO PROVIDE HABITAT FOR AQUATIC ORGANISMS AND TERRESTRIAL WILDLIFE

Width of Zone 1 and/or Zone 2 will be expanded to meet the minimum requirements of the wildlife or aquatic species and associated communities of concern. (See Job Sheet).

Establish plant communities that address the target wildlife needs and existing resources in the watershed.

ENVIRONMENTAL CONCERNS

Planning and implementation of this practice will be preceded by an environmental evaluation using the “Environmental Data Sheet”, Form VA-EE-1 or equivalent, and

related guidelines found in General Manual 190, Part 410 (Virginia Amendments).

CONSIDERATIONS

The severity of bank erosion, concentrated flow erosion or mass soil movement and its influence on existing or potential riparian trees and shrubs should be assessed. Bank stability activities may be needed before establishing a riparian forest buffer.

When concentrated flow erosion and sedimentation cannot be controlled vegetatively, consider structural or mechanical treatments.

Where animal waste is a problem, waste management systems must be applied on the adjacent fields. Forest buffers shall not be planned as a substitute practice.

Use of this practice without other nutrient, pesticide, prescribed grazing, sediment, and erosion control practices may result in adverse impacts on the buffer vegetation and hydraulics.

Consider joining existing and new buffers to increase the continuity of cover and further moderate temperatures, improve habitat and enhance water quality functions.

Buffering both sides of a watercourse greatly enhances the functions of the buffers.

Favor tree and shrub species that are native, and have multiple values such as those suited for timber, mast production, biomass, nuts, fruit, browse, nesting, aesthetics, and tolerance to locally used herbicides.

Species selected should represent historical riparian species adapted to the locality.

Tree and shrub species, which may be alternate hosts to undesirable pests, should be avoided.

Species diversity should be considered to avoid loss of function due to species-specific pests.

Allelopathic impacts of plants, particularly black walnut, should be considered.

The location, layout and density of the buffer should complement natural features, and mimic natural riparian forests.

Consider the positive and negative impact that beaver, muskrats, deer, groundhogs, and other local wildlife species may have on the successful establishment and management of the riparian buffer and the stream system.

Cultural resources review and field inspection will be conducted on each site, since the establishment of a forested buffer is considered an undertaking.

PLANS AND SPECIFICATIONS

Specifications for applying this practice shall be prepared for each site and recorded using approved specification sheets, job sheets, technical notes, and narrative statements in the conservation plan, or other acceptable documentation.

OPERATION AND MAINTENANCE

Job sheet(s) or site specific management plans shall be developed and provided to the client to assure performance of the practice as intended.

The following actions shall be carried out to ensure that this practice functions as intended throughout its expected life:

- The riparian forest buffer will be inspected periodically and protected from adverse impacts such as excessive vehicular and pedestrian traffic, pest infestations, pesticides, livestock or wildlife damage, and fire.
- Replacement of dead trees or shrubs and control of undesirable vegetative competition will be continued until the buffer is, or will progress to, a fully functional condition.
- As applicable, control of concentrated flow erosion and sediment deposition shall be controlled by an adjacent filter strip (Zone 3).
- Any use of fertilizers, pesticides, and other chemicals to assure buffer function shall not compromise the intended purpose.

Note: The requirements of specific USDA programs or other funding sources may impose establishment and management limitations in addition to or more restrictive than those specified in this standard.

REFERENCES

1. USDA, Forest Service, 1991, Riparian Forest Buffers – Functional Design for Protection and Enhancement of Water Resources, NA-PR-07-91, prepared by David Welsh.

2. USDA, NRCS, 1997, NRCS/RCA Issue Brief 13 Riparian Areas – Implications for Management.

3. USDA, NRCS, 1996, NRCS/RCA Issue Brief 11 Riparian Areas – Environmental Uniqueness, Functions, and Values.

4. USDA, NRCS, General Manual 190, Part 410 (Virginia Amendments).

5. USDA, NRCS, 2000, Conservation Buffers to Reduce Pesticide Losses, NRCS, Fort Worth, Texas.

6. Tjaden, Robert L. and Glenda M. Weber, Fact Sheet #724, Introduction to the Riparian Forest Buffer, Cooperative Extension Service, University of Maryland.

7. Tjaden, Robert L. and Glenda M. Weber, Fact Sheet #733, Riparian Buffer Systems, Cooperative Extension Service, University of Maryland.

8. USDA, et. al., Stream Corridor Restoration – Principles, Processes and Practices.

9. USDA, Palone, R. S. and A. H. Todd (editors), 1997, Chesapeake Bay Riparian Handbook: A Guide for Establishing and Maintaining Riparian Forest Buffers, USDA Forest Service, NA-TP-02-97, Radnor, PA.

10. USDA, NRCS, 2001, *Plant Establishment Guide for Virginia*.

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Approved Practice Narratives

(Acre)

CODE 391

391 D1 Riparian Forest Buffer: A buffer meeting the minimum width requirement will be established and maintained along the riparian zone. Attached specifications provide details for actual widths, seeding and other components necessary for establishment and maintenance of this practice.

391 D2 Riparian Forest Buffer: An existing forest buffer with a minimum width requirement will be maintained along the riparian zone. Attached specifications provide details for actual widths and maintenance requirements.

391 D3 Riparian Forest Buffer: A forest buffer with a minimum width of 50 feet will be established and maintained between the agricultural fields and the locally identified environmental feature as required by the Chesapeake Bay Preservation Act and local ordinance. (Must have associated BMP's implemented on adjacent agricultural land.)

391 D4 Riparian Forest Buffer: An existing forest buffer with a minimum width of 50 feet will be maintained between the agricultural fields and the locally identified environmental feature as required by the Chesapeake Bay Preservation Act and local ordinance. (Must have associated BMP's implemented on adjacent agricultural land.)

391 D5 Riparian Forest Buffer: A forest buffer with a minimum width of 100 feet will be established and maintained between the agricultural fields and the locally identified environmental feature as required by the Chesapeake Bay Preservation Act and local ordinance.

391 D6 Riparian Forest Buffer: An existing forest buffer with a minimum width of 100 feet will be maintained between the agricultural fields and the locally identified environmental feature as required by the Chesapeake Bay Preservation Act and local ordinance.